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system in Wales. It is certain that from the group of the Glyders and Tryfan, no less than three glaciers—one of vast extent—poured into the vales and plains below ; and probably round every peak or group of nearly equal height, and whose masses are broken up into those deep hollows and amphitheatres which are so favorable to the collection of a reservoir of snow—and, in a climate of variable temperature, to the consequent development of glaciers—similar ice-streams must have filled up the valleys and choked the gorges in every direction. The great peculiarity of this scenery must have been the small elevation of the peaks and mountain ranges above the general level of the glaciers. In Switzerland the summits commonly tower for thousands of feet above the highest parts of the highest glaciers, properly so-called ; and the great glacier basins and reservoirs are commonly bounded by huge aretes of bare and rugged rock, specked only with snowy deposits, such as the ranges which hem in the glaciers de l'Echand, the central tributary of the Mer de Glace, or which block up the extremities of the glacier of the Aar and the lower glacier of Grindelwald. In Wales, the corresponding heights must have been measured by hundreds, instead of thousands of feet, for many of the glacier basins themselves lie high ; and in this respect, despite the magnificent effect of such a wide expanse of snow and of broken and crevassed ice, the difference must have been unfavorable to the grandeur of the scenery. Something of the same kind may be seen in the northern glaciers of Norway, though the heights which surmount them are higher above the glacier level than was probably the case in North Wales, and there is no reason to suspect the existence in Wales of those vast fields of snow whose aspect and distinguishing peculiarities are so essentially different from those glaciers, and which give to the scenery of Norway a character so unique and extraordinary.

THE FOOD OF THE OWLS.

BY W. S. STRODE, M.D.

A FEW years ago Pennsylvania, Ohio, and some of the more eastern States enacted laws offering a bounty of fifty cents per head for all hawks and owls that should be killed.

This munificent bounty aroused the professional hunters, and for the time being legitimate game was abandoned in many sections of

these States for the more remunerative business of hawk and owl shooting. Thousands were killed and the Raptores seemed in a fair way to be exterminated.

This merciless slaughter arrested the attention of ornithological and scientific societies, and they at once set to work to devise means to check the work of destruction.

Committees and individuals were appointed to investigate the food habits of the hawks and owls. Hundreds of dissections of stomachs were made, and after a thorough research the following report was made :

“ *Resolved*, That the hawks and owls are of great benefit to the farmer and render him far greater service than injury, and that it is unwise to select any of them for destruction.”

This report was concurred in by the leading naturalists throughout the length and breadth of the land, and as a consequence these obnoxious laws have been repealed.

A partial exception was made against the Sharp-shinned Hawk, Coopers' Hawk, and the Great-horned Owl.

It is to the latter bird that I will mainly give attention.

As the eagle heads the list of the diurnal birds of prey, so is the Great-horned Owl the most noble of the nocturnal birds, and the ancients chose well when they assigned to Minerva this bird as the emblem of wisdom.

Owing to a suitable habitat probably more of these owls are to be found in the Spoon River country of Central Illinois than in any other section of like limits in the United States. From my boyhood to the present they have always excited within me a lively interest and curiosity.

Their unsavory reputation as chicken thieves has led to their being destroyed whenever possible, and as a consequence in many parts of the country where they were once quite common they are now extinct.

This bad reputation and consequent destruction of this owl, in my experience and observation, is not all deserved.

Many times when a lad have my slumbers been broken in upon by my mother's voice calling up the stairway, “Get up quick ! an owl is after the chickens.” A careful investigation would reveal the intruder perched in the top of an apple-tree or on a limb close by the side of an old hen that would be waking the echoes of the night with her squalling. The owl in the meantime would be bowing and swaying his body to and fro, occasionally uttering a low

hoo ! hoo ! hoo ! seemingly regarding the whole performance as a huge joke.

Unfortunately for the owl, this comedy would sometimes be quickly turned to a tragedy by a load from my shotgun, bringing him to the ground, and perhaps the hen also.

The principal food of the owl in the Spoon River country consists of small rodents, and the gray rabbit furnishes the greater part of it. Reference to my note-book for the years 1887-8 shows the following :

March 20, '87. Found a *Bubo's* nest in a large red oak tree, forty feet to first limb, seventy-five to nest. A tremendous climb, but with the aid of a splendid pair of climbers I got up to it, finding it occupied by a trio of downy baby owls of different sizes, who tried to look very fierce at my intrusion. In the nest with them was a whole rabbit and parts of another.

March 27, '87. Great-horned Owl's nest in white oak tree, standing in a steep hollow. Could see young birds from hillside above. An easy climb to the nest found it containing two half-grown young and half of a rabbit.

March 30, '87. Discovered a Great-horned Owl's nest in a cavity of a soft maple tree, thirty feet from ground. Found in it three young and parts of several rabbits.

March 31, '87. Located a *Bubo's* nest in an elm snag fourteen feet high, standing on a creek bank. Found in the nest three young owls with their feathers turned wrong end to, snapping their bills wrathfully and looking the very personification of fierceness. The largest of the three was half-grown, while the smallest was near the size of a quail.

In the cavity was one whole rabbit, the hindquarters of another, a flying squirrel, and a quantity of fish-scales. While I was sitting on a limb by the side of the cavity, watching the little fellows, the parent owls suddenly appeared upon the scene, and I had a cyclone about my ears for a few minutes. Such a whirl of feathers, claws, fierce eyes, snapping beaks, hootings and screechings about my head was calculated to terrorize one unaccustomed to the actions of this, the greatest of all the owls.

After continuing these demonstrations for a few minutes, one of them, the male I supposed from his coarse voice and white crescent under the chin, settled down upon a limb a few feet from the ground just over the creek.

His manner now underwent a change. Swaying to and fro for a

short time, he fell off the limb to the ground, and then tumbled about in the leaves in an apparently very crippled and helpless condition. My dog, that had been sitting all this time in a perfect frenzy of excitement at the foot of the stub, watching the owl, now forgot his training and made a headlong rush through the creek for the owl, but it was up and away, leaving him disappointed and crest-fallen. I returned to the ground and departed, leaving this interesting family to the enjoyment of their well-furnished larder.

I subsequently learned that these young *Bubos* came to a tragic end. Some boys, finding them in the stub, threw them out into the creek, where they were worried to death by their dogs.

March 28, '88. Found a Great-horned Owl's nest containing two young owls, parts of a rabbit, and a flying-squirrel. Nest in a cavity in a soft maple.

March 29, '88. *Bubo's* nest in top of a white oak tree. An old nest of Red-tailed Hawk, two small young owls, a whole rabbit, and a half rabbit—a great deal more rabbit than owl.

March 30, '88. Nest in a wild cherry tree. A crow's nest pre-empted and reconstructed. Contained one young owl, a rabbit, a flying squirrel, and a robin. This is the only nest in which was found the remains of any bird.

Last spring, while out hunting *Bubo's* nests, I found a dead Screech Owl lying on the upper side of a broken plum tree limb. Its back, from the neck to the tail, was as neatly laid open as it could have been done with a sharp knife. I credited this piece of wantonness to the Great-horned Owl.

One bright day in March, '87, I was returning from a professional call. At this season of the year, when the hawks and owls are nesting, it is my custom, when not hurried by business, to leave the highways and ride haphazard through the woods, regardless of fences, hills, hollows, or creeks.

On this day I was riding leisurely along through heavy timber, down "Johnson's Creek," when my attention was arrested by the noisy cawing of a large flock of crows on the hillside two or three hundred yards to my right.

I at once guessed the cause of all this tumult to be a Great-horned Owl, for of all the denizens of the forest none other will so arouse the uncontrollable indignation of the family *Corvidæ*.

I had not thought of disturbing this camp-meeting of the crows, until suddenly a regular pandemonium of shrieks, and directly the scurrying by of a number of the sable birds, each one

shouting bloody murder at the top of his voice, plainly told me that something terrible had happened in the dark woods on the hillside above. Turning my horse loose, I went noiselessly up the hillside on a tour of investigation.

Presently a large *Bubo* flew up from the ground a few rods in front of me, and upon going to the spot I discovered the cause of the sudden great consternation of the crows. The owl had wreaked summary vengeance upon one of his tormentors, and the smoking body lay upon the ground in two halves, having been divided transversely instead of lengthwise as in the case of the Screecher. A part of the viscera had been devoured.

Last spring, while wandering about in the woods on "Geetur Creek," a tributary of the Spoon, I was attracted by the barking of my dog, and on going to him, found a young *Bubo* that had fallen out of the parent nest. It was in a little creek bed, and the parent owls had nicely concealed it by covering it up with leaves.

I decided at once to make a pet of it. A few days later I took from a family of four in a hollow sycamore a half-grown Barred Owl (*Syrnium nebulosum*), and placed it with the first, with the intention of studying and comparing the habits and dispositions of the two birds.

They are now full grown and have indeed proved to be very interesting pets. They have the run of an outhouse that gives them plenty of room to fly about in. They have become very much attached to each other, and if one is removed from their apartment the other is inconsolable until its return. And then such a bowing and nodding to each other is ludicrous indeed. The disposition of the two birds is very dissimilar. The *Bubo* is by far the nobler bird—as tame as a cat, good natured and intelligent, pleased at the appearance of familiar faces, but suspicious of strangers. Always greets my appearance at the door of the owl-house with a low hoo ! hoo ! hoo ! followed immediately by a shrill screech or at times almost a quack. Greatly enjoys having his head scratched; shuts his eyes, and his voice will sink almost to a whisper.

The *Syrnium* is just the opposite; untamable, sneaking, revengeful ; suspicious alike of everything and everybody. Anything from mussels to cats is relished as food. Fat or tallow they will not touch. Mice, rats, ground-squirrels, kittens, chicken-heads and small birds are first thoroughly crushed by their beaks and are then usually swallowed whole. Before swallowing birds they first pluck out their feathers.

It is said that if an owl once gets a taste of fish he is a fisherman ever afterwards, and of this fact I have seen many demonstrations.

At Thompson's Lake, on the Illinois River, I have several times in the dusk of the evening seen the Barred Owl feasting on discarded fish. The shutting down of the water-gates of the mill often leaves many small fish stranded on the gravel bed of the river, just below my house, and I have many times witnessed a pair of Great-horneds fly down from the trees on the opposite bank to feast upon them.

During the summer months small fish formed the staple diet of my pair of pets, and a pound of shiners three times a day was about the amount they required.

Their manner of feeding is very different. When a canful of minnows is poured out to them the Bubo will jump into their midst, and, as my boy sometimes remarks, "Just hog them down," two at a time.

The Syrnium will pick out a particularly lively minnow, eye it for a moment, then spring upon it and grasp it in the talons of one foot, and after holding it for a few seconds quickly transfer it to his beak, after which he will gaze about defiantly for a short time and then swallow it.

This bird has developed a great hatred for the boys, probably as a result of their disposition to guy him whenever an opportunity offers. This dislike has lately taken shape by his making a dive at every boy that enters his house, raking the top of his head with his claws as he passes over him, and then giving vent to his peculiar, laughing cry of "Who ! hoo ! hoo are you !" This trick he has played so often on the "gamins," that, at present, not one of them can be induced to enter his apartments.

Some days ago a venturesome lad laid his eye up to a knot-hole in the side of the owl-house to take a peep at them. His lusty screams quickly brought me from my office to his side. The blood was running freely^d down his cheek. The aim of the Syrnium had been unerring. From his perch on the opposite side of the building he had made a dive for the eye, and running one foot through the hole had lacerated the skin badly, but luckily not injuring the eye.

Sometimes I put a live rabbit in the owl-house, and then there is fun to see the Bubo getting up courage to attack it. No bully ever gave better evidence of a mixture of cowardice and bravado. He will bow and sway his body to and fro, run along his perch and back again, look to me for encouragement, then bow, look at the rabbit and bow, all the while uttering his shrill scream, which becomes

more and more fierce as his courage rises. Finally, after assuring him that he is a brave fellow, and no coward, to go for it, etc., he makes the attack. And now his whole nature suddenly changes, and instead of a hesitating bully he more nearly resembles a raging lion.

It is said that the tiny Downy Woodpecker more nearly resembles the great Ivory-billed than does any other of the many species of the family Picidæ.

The same may be said of the Little Screech and the Great-horned Owl, the little Scops being a tiny image in action and appearance of its great relative, from whom it probably evolved.

In the spring and summer of 1887, at the request of Dr. R. W. Shufeldt, U. S. A., I was making a collection of nestlings of representative American birds, that was to be sent to Prof. Parker, of London, to be utilized by him in his great work on "Avian Osteology." Among the many birds brought to me by my boy collectors was a family of four young Screech Owls. Downy little fellows, all beak, claws, and eyes. Wishing to use but one of them as an alcoholic specimen, I was at a loss what to do with the others, as the nest from which they were taken was on a creek five miles away. I finally concluded to adopt them, and a family of kittens, which they resembled in many respects, would not have proved more interesting and trusting pets.

From first to last small fish was their main diet, and it was amusing, indeed, when their food was brought, to see the downy little fellows rush and tumble over each other in their eagerness to get at it. If a mouse was given to them it would first be put through a bone-breaking process and then swallowed. Small birds would be thoroughly picked and then swallowed head first.

After they became able to fly about, they were taken from the box in which they had been kept and put into the apple trees growing in my yard to shift for themselves. But they refused to shift; on the contrary, seemed to consider themselves as a part of the family, and for weeks remained about the yard, and in the dusk of the evening would come at once on being called, sometimes from the mill a hundred yards away, or from the trees across the river.

A very interesting feature connected with these little Scops was the manner in which they were treated by the other birds of the vicinity. About once a day the birds would assemble to harass and scold them, the usual time being a little before sundown. At a signal, generally from the Robin, they would come from all direc-

tions—the Jay and the Purple Grackle from their nests in the apple trees; the Rose-breasted Grosbeak from the top of the hackberry; the Cardinal and Wood Thrush from the box elders across the river; the Orioles from their swinging nests in the elm and sugar maple; the Bee Martin and Warbling Vireo from the silver-leaved; the Jenny Wren from the eaves of the portico; the Cat-bird and Brown Thrasher from the gooseberry bushes, and the Maryland Yellow Throat from his nest in the thick weeds on the river's bank—all would come to devote a few minutes to scolding their common enemy.

The Jay, the Grackle, the Cat-bird, and the Robin would do the aggressive business, while the other birds, from a respectful distance, would be the spectators. The Robin, in particular, would show the greatest excitement in these attacks. He would often fly down to the ground near where I sat and in the most frantic manner try to call my attention to the fact that there was a terrible owl in the apple tree.

At first these attacks almost frightened the Screechers to death; but they soon became accustomed to them, and, in fact, seemed rather to enjoy this bird *matinée*.

One of these interesting birds was stoned to death by a man as it was perched upon the fence near his repair-shop. Another was shot and killed by a *kind-hearted* lady that wished to display her marksmanship. A third is still about town, and his tremulous notes are often heard around my premises in the dusk of the evening.

PRIMITIVE ARCHITECTURE.

I.

SOCIOLOGICAL INFLUENCES.

BY BARR FERREE.

FOOD and shelter constituted the first and chief wants of primitive man, and to their satisfaction he devoted his dormant energies. At first, unable to construct his own shelter, he was obliged to depend upon such as nature furnishes. The *cave* was at once the most convenient and the safest. Its universal use in primitive times